

**WHAT IS CLAIMED IS:**

1. A peer computing system, comprising:

5 a plurality of peer nodes, operable to couple to a network, wherein the plurality of peer nodes are operable to participate a peer-to-peer environment on the network in accordance with one or more peer-to-peer platform protocols for enabling the plurality of peer nodes to discover each other, communicate with each other, and cooperate with each other to form peer groups and share network resources in the peer-to-peer environment; and

a resolver node operable to:

15 receive a query message from one of the plurality of peer nodes, wherein the query message is formatted in accordance with a peer resolver protocol, wherein the query message indicates a request to a resource implemented by one or more of the plurality of peer nodes;

20 determine a particular instance of the resource on a particular one of the one or more peer nodes; and

forward the query message to the determined resource instance.

25 2. The peer computing system as recited in claim 1, wherein the determined resource instance is configured on the particular one of the one or more of peer nodes to send a response message in response to the query message to the peer node of the plurality of peer nodes sending the query message, wherein the response message is formatted in accordance with the peer resolver protocol.

3. The peer computing system as recited in claim 1, wherein the determined resource instance is configured on the particular one of the one or more peer nodes to send a response message in response to the query message to the resolver node, wherein the resolver node is operable to forward the response message to the peer node of the plurality of peer nodes sending the query, and wherein the response message is formatted in accordance with the peer resolver protocol.

4. The peer computing system as recited in claim 1, wherein the resource implemented by the one or more peer nodes is configured on each of the one or more nodes to:

implement one or more resource handlers wherein each of the one or more resource handlers is operable to:

receive the query message; and

generate a response message in response to the query message formatted in accordance with the peer resolver protocol; and

register the one or more resource handlers with the resolver node.

5. The peer computing system as recited in claim 4, wherein the query message includes a handler name specifying one of the one or more resource handlers to generate the response message.

6. The peer computing system as recited in claim 4, wherein the response message includes a handler name specifying one of the one or more resource handlers that generated the response message.

7. The peer computing system as recited in claim 1, wherein the resource is a service.

8. The peer computing system as recited in claim 1, wherein the resource is content.

9. The peer computing system as recited in claim 1, wherein the resource is an application.

10. The peer computing system as recited in claim 1, wherein the resolver node is a peer node of the plurality of peer nodes.

11. The peer computing system as recited in claim 1, wherein the resolver node is operable to cache query messages and cache response messages.

12. The peer computing system as recited in claim 1, wherein the query message includes a credential corresponding to the peer node sending the query message, wherein the resolver node is further operable to:

determine if the peer node is authorized to access the resource using the credential of the peer node included in the query message; and

prohibit the peer node from accessing the resource if the peer node is not authorized.

13. The peer computing system as recited in claim 1, wherein the query message includes a query identifier for identifying the query message.

14. The peer computing system as recited in claim 1, wherein the query message includes a query field specifying the requested information.

15. The peer computing system as recited in claim 1, wherein the response message includes a credential corresponding to the particular one of the one or more peer nodes hosting the determined resource instance to which the query message was forwarded.

16. The peer computing system as recited in claim 1, wherein the response message includes a query identifier corresponding to the query message.

17. The peer computing system as recited in claim 1, wherein the response message includes a response field comprising the information requested by the query message.

18. The peer computing system as recited in claim 1, wherein, in the determination, the determined resource instance is a resource instance located a fewest number of hops on the network from the peer node sending the query message.

19. The peer computing system as recited in claim 1, wherein, in the determination, the determined resource instance is implemented on the particular one of the one or more peer nodes that has the least processing load of the one or more peer nodes.

20. The peer computing system as recited in claim 1, further comprising:

a rendezvous node coupled to the network;

wherein the rendezvous node is operable to:

receive the query message;

determine whether to propagate the query message to one or more of the plurality of peer nodes;

propagate the query message to one or more of the plurality of peer nodes if it is determined to propagate the query message to one or more of the plurality of peer nodes;

discard the query message if it is determined not to propagate the query message;

determine whether to designate the rendezvous node as the originator of the query message; and

designate the rendezvous node as the originator of the query message if it is determined to designate the rendezvous node as the originator of the query message.

21. The peer computing system as recited in claim 20, wherein in said determining, the rendezvous node is configured to communicate with a service on the network, wherein the service is operable to:

determine whether to propagate the query message; and

determine whether to designate the rendezvous node as the originator of the query message.

22. A resolver node, comprising:

a processor;

a port operable to couple the peer node to a network;

a memory operable to store program instructions, wherein the program instructions are executable by the processor to:

5

receive a query message from a peer node on the network, wherein the query message is formatted in accordance with a peer resolver protocol, wherein the query message indicates a request to a resource implemented by one or more other peer nodes on the network;

10

determine a particular instance of the resource on a particular one of the one or more other peer nodes;

15

forward the query message to the determined resource instance.

23. The resolver node as recited in claim 22, wherein the determined resource instance is configured on the other peer node to send a response message in response to the query message to the peer node, wherein the response message is formatted in accordance with the peer resolver protocol.

20

24. The resolver node as recited in claim 22, wherein the determined resource instance is configured on the other peer node to send a response message in response to the query message to the resolver node, wherein the resolver node is operable to forward the response message to the peer node, and wherein the response message is formatted in accordance with the peer resolver protocol.

25

25. The resolver node as recited in claim 22, wherein the resource implemented by the one or more peer nodes is configured on each of the one or more peer nodes to:

30

implement one or more resource handlers wherein each of the one or more  
resource handlers is operable to:

receive the query message; and

5

generate a response message in response to the query message formatted in  
accordance with the peer resolver protocol; and

register the one or more resource handlers with the resolver node.

10

26. The resolver node as recited in claim 25, wherein the query message includes  
a handler name specifying one of the one or more resource handlers to generate the  
response message.

15

27. The resolver node as recited in claim 25, wherein the response message  
includes a handler name specifying one of the one or more resource handlers that  
generated the response message.

20

28. The resolver node as recited in claim 22, wherein the resource is a service.

29. The resolver node as recited in claim 22, wherein the resource is content.

30. The resolver node as recited in claim 22, wherein the resource is an  
application.

25

31. The resolver node as recited in claim 22, wherein the resolver node is a peer  
node.

32. The resolver node as recited in claim 22, wherein the resolver node is  
operable to cache query messages and cache response messages.

30

33. The resolver node as recited in claim 22, wherein the query message includes a credential corresponding to the peer node, wherein the program instructions are further executable to:

5

determine if the peer node is authorized to access the resource using the credential of the peer node included in the query message; and

prohibit the peer node from accessing the resource if the peer node is not authorized.

10

34. The resolver node as recited in claim 22, wherein the query message includes a query identifier for identifying the query message.

35. The resolver node as recited in claim 22, wherein the query message includes a query field specifying the requested information.

15

36. The resolver node as recited in claim 22, wherein the response message includes a credential corresponding to the other peer node.

20

37. The resolver node as recited in claim 22, wherein the response message includes a query identifier corresponding to the query message.

38. The resolver node as recited in claim 22, wherein the response message includes a response field comprising the information requested by the query message.

25

39. The resolver node as recited in claim 22, wherein, in the determination, the determined resource instance is a resource instance located a fewest number of hops on the network from the peer node sending the query message.

30



40. The resolver node as recited in claim 22, wherein, in the determination, the determined resource instance is implemented on the particular one of the one or more other peer nodes that has the least processing load of the one or more other peer nodes.

5           41. A peer computing system, comprising:

a plurality of peer nodes, operable to couple to a network, wherein the plurality of peer nodes are operable to participate a peer-to-peer environment on the network in accordance with one or more peer-to-peer platform protocols for enabling the plurality of peer nodes to discover each other, communicate with each other, and cooperate with each other to form peer groups and share network resources in the peer-to-peer environment; and

10           means for receiving a query message from one of the plurality of peer nodes, wherein the query message is formatted in accordance with a peer resolver protocol, wherein the query message indicates a request to a resource implemented by one or more of the plurality of peer nodes;

15           means for determining a particular instance of the resource on a particular one of the one or more peer nodes;

20           means for forwarding the query message to the determined resource instance.

25           42. The peer computing system as recited in claim 41, further comprising means for sending a response message in response to the query message to the peer node of the plurality of peer nodes sending the query message, wherein the response message is formatted in accordance with the peer resolver protocol.

30           43. The peer computing system as recited in claim 41, further comprising:

means for implementing one or more resource handlers for receiving the query message on the resource implemented by the one or more peer nodes;

5 means generating a response message using a particular one of the one or more resource handlers in response to the query message formatted in accordance with the peer resolver protocol.

44. The peer computing system as recited in claim 41, wherein the query message includes a handler name specifying one of the one or more resource handlers to generate the response message.  
10

45. The peer computing system as recited in claim 41, wherein the response message includes a handler name specifying one of the one or more resource handlers that generated the response message.  
15

46. The peer computing system as recited in claim 41, wherein the resource is a service.

47. The peer computing system as recited in claim 41, wherein the resource is content.  
20

48. The peer computing system as recited in claim 41, wherein the resource is an application.

25 49. The peer computing system as recited in claim 41, further comprising:

means for caching query messages; and

means for caching response messages.  
30

50. The peer computing system as recited in claim 41, wherein the means for determining comprise means for determining a particular resource instance located a fewest number of hops on the network from the peer node sending the query message.

5 51. The peer computing system as recited in claim 41, wherein the means for determining comprise means for determining a particular resource instance on the particular one of the one or more peer nodes that has the least processing load of the one or more peer nodes.

10 52. The peer computing system as recited in claim 41, further comprising means for determining if the peer node is authorized to access the requested resource.

53. The peer computing system as recited in claim 41, further comprising:

15 a rendezvous node coupled to the network operable to receive the query message;

means for determining whether to propagate the query message to one or more of the plurality of peer nodes;

20 means for propagating the query message to one or more of the plurality of peer nodes if it is determined to propagate the query message to one or more of the plurality of peer nodes;

25 means for discarding the query message if it is determined not to propagate the query message;

means for determining whether to designate the rendezvous node as the originator of the query message; and

means for designating the rendezvous node as the originator of the query message  
if it is determined to designate the rendezvous node as the originator of the  
query message.

5 54. A method, comprising:

implementing a peer-to-peer environment on a network in accordance with one or  
more peer-to-peer platform protocols for enabling a plurality of peer nodes  
to discover each other, communicate with each other, and cooperate with  
10 each other to form peer groups and share network resources in the peer-to-  
peer environment;

receiving a query message from one of the plurality of peer nodes, wherein the  
query message is formatted in accordance with a peer resolver protocol,  
15 wherein the query message indicates a request to a resource implemented  
by one or more of the plurality of peer nodes;

determining a particular instance of the resource on a particular one of the one or  
more peer nodes; and

20 forwarding the query message to the determined resource instance.

55. The method as recited in claim 54, further comprising sending a response  
message in response to the query message to the peer node sending the query message,  
25 wherein the response message is formatted in accordance with the peer resolver protocol.

56. The method as recited in claim 54, further comprising:

implementing one or more resource handlers for receiving the query message on  
30 the resource implemented by the one or more peer nodes;

generating a response message using a particular one of the one or more resource handlers in response to the query message formatted in accordance with the peer resolver protocol.

5

57. The method as recited in claim 56, wherein the query message includes a handler name specifying one of the one or more resource handlers to generate the response message.

10

58. The method as recited in claim 56, wherein the response message includes a handler name specifying one of the one or more resource handlers that generated the response message.

15

59. The method as recited in claim 54, wherein the resource is a service.

60. The method as recited in claim 54, wherein the resource is content.

61. The method as recited in claim 54, wherein the resource is an application.

20

62. The method as recited in claim 54, wherein said determining comprises determining a particular resource instance located a fewest number of hops on the network from the peer node sending the query message.

25

63. The method as recited in claim 54, wherein said determining comprises determining a particular resource instance on the particular one of the one or more peer nodes that has the least processing load of the one or more peer nodes.

30

64. The method as recited in claim 54, wherein the query message includes a credential for the peer node, wherein the method further comprises:

determining if the peer node is authorized to access the resource using the credential of the peer node included in the query message; and

prohibiting the peer node from accessing the resource if the peer node is not authorized.

65. The method as recited in claim 54, further comprising:

determining whether to propagate the query message received by a rendezvous node coupled to the network to one or more of the plurality of peer nodes;

propagating the query message to one or more of the plurality of peer nodes if it is determined to propagate the query message to one or more of the plurality of peer nodes;

discarding the query message if it is determined not to propagate the query message;

determining whether to designate the rendezvous node as the originator of the query message; and

designating the rendezvous node as the originator of the query message if it is determined to designate the rendezvous node as the originator of the query message.

66. An article of manufacture comprising program instructions, wherein the program instructions are computer-executable to implement:

implementing a peer-to-peer environment on a network in accordance with one or more peer-to-peer platform protocols for enabling a plurality of peer nodes

to discover each other, communicate with each other, and cooperate with each other to form peer groups and share network resources in the peer-to-peer environment; and

5 receiving a query message from one of the plurality of peer nodes, wherein the query message is formatted in accordance with a peer resolver protocol, wherein the query message indicates a request to a resource implemented by one or more of the plurality of peer nodes;

10 determining a particular instance of the resource on a particular one of the one or more peer nodes;

forwarding the query message to the determined resource instance.

15 67. The article of manufacture as recited in claim 66, wherein the program instructions are further executable to implement sending a response message in response to the query message to the peer node sending the query message, wherein the response message is formatted in accordance with the peer resolver protocol.

20 68. The article of manufacture as recited in claim 66, wherein the program instructions are further executable to implement:

implementing one or more resource handlers for receiving the query message on the resource implemented by the one or more peer nodes;

25 generating a response message using a particular one of the one or more resource handlers in response to the query message formatted in accordance with the peer resolver protocol.

69. The article of manufacture as recited in claim 66, wherein, in said determining, the program instructions are further executable to implement determining a particular resource instance located a fewest number of hops on the network from the peer node sending the query message.

5

70. The article of manufacture as recited in claim 66, wherein, in said determining, the program instructions are further executable to implement determining a particular resource instance on the particular one of the one or more peer nodes that has the least processing load of the one or more peer nodes.

10

71. The article of manufacture as recited in claim 66, wherein, in said determining, the program instructions are further executable to implement:

15 determining whether to propagate the query message received by a rendezvous node coupled to the network to one or more of the plurality of peer nodes;

20 propagating the query message to one or more of the plurality of peer nodes if it is determined to propagate the query message to one or more of the plurality of peer nodes;

discarding the query message if it is determined not to propagate the query message;

25 determining whether to designate the rendezvous node as the originator of the query message; and

designating the rendezvous node as the originator of the query message if it is determined to designate the rendezvous node as the originator of the query message.

30